Claims

1. Gas diffusion electrode comprising a hydrophobic gas diffusion layer, a reaction layer, a barrier layer, and a hydrophilic layer arranged in the mentioned order.

2. Gas diffusion electrode according to claim 1, wherein an electrode substrate is arranged between the hydrophobic gas diffusion layer and the reaction layer.

3. Gas diffusion electrode according to claim 1, wherein the barrier layer is substantially made of a ceramic material.

4. Gas diffusion electrode according to claim 3, wherein the ceramic material is at least one oxide and the at least one oxide is a zirconium oxide, titanium oxide, hafnium oxide or a mixture thereof.

5. Gas diffusion electrode according to claim 3, wherein the ceramic material is made of zirconium oxides.

6. Gas diffusion electrode according to claim 2, wherein the electrode substrate is made of silver or silver plated metals.

7. Gas diffusion electrode according to claim 1, wherein the gas diffusion electrode is oxygen depolarised.

8. Gas diffusion electrode comprising a hydrophobic gas diffusion layer, a reaction layer, a barrier layer, and a hydrophilic layer arranged in the mentioned order, and an electrode substrate being arranged between the hydrophobic gas diffusion layer and the reaction layer.

9. Gas diffusion electrode comprising a hydrophobic gas diffusion layer, a reaction layer, a barrier layer, and a hydrophilic layer arranged in the mentioned order, the barrier layer being made from a material of at least one oxide and the at least one oxide is a zirconium oxide, titanium oxide, hafnium oxide or a mixture thereof.

10. Method for manufacturing a gas diffusion electrode according to claim 1 comprising arranging a hydrophobic gas diffusion layer, a reaction layer, a barrier layer and a hydrophilic layer in the mentioned order.

11. Method according to claim 10, comprising arranging an electrode substrate in between the hydrophobic gas diffusion layer and the reaction layer.

12. Electrolytic cell comprising an anode compartment and a cathode compartment partitioned by a separator, wherein a gas diffusion electrode comprising a hydrophobic gas diffusion layer, a reaction layer, a barrier layer, and a hydrophilic layer, arranged in the mentioned order, is arranged in the cathode compartment.

13. Process for the production of alkali metal hydroxide and chlorine in an electrolytic cell, said electrolytic cell comprising an anode compartment and a cathode compartment partitioned by a separator, wherein an anode is arranged in the anode compartment and a gas diffusion electrode comprising a hydrophobic gas diffusion layer,

a reaction layer, a barrier layer, and a hydrophilic layer, arranged in the mentioned order, is arranged in the cathode compartment, said process comprising

a) supplying an oxygen-containing gas to th cathode compartment

b) supplying an aqueous solution of alkali m tal chloride to the anode compartment

c) passing an electric current through the electrolytic cell from the anode to the gas diffusion electrode thereby forming alkali metal hydroxide in the cathode compartment and chlorine in the anode compartment.